Draft Environmental Assessment

Robb-Ledford and Blacktail Wildlife Management Areas
Non-Commercial Conifer Removal Project

June 2017

1.0: PURPOSE OF AND NEED FOR ACTION

1.1 Proposed Action

Montana Department of Fish, Wildlife, and Parks (FWP) proposes to maintain, enhance, and expand sagebrush grassland on the Robb-Ledford and Blacktail Wildlife Management Areas (WMA) through removal of expanding conifer forests. The proposed action would remove all Douglas-fir (*Pseudotsuga menziesii)*, Rocky Mountain juniper (*Juniperus scopulorum)*, and limber pine (*Pinus flexilis)* trees from approximately 1,550 acres (Figure 1). Tree removal would be completed using mechanical methods. In areas of low tree density (large majority of the project area), trees would be felled, bucked, and scattered, with remaining debris left to decompose naturally. In areas of high tree density (large minority of the project area), trees would be felled, piled where practical, and burned when dry. Broadcast burning in areas where piling slash is not practical due to the volume of material may be considered, in cooperation with Montana Department of Natural Resource and Conservation (DNRC). No new roads or trails would be constructed. This is a non-commercial project.

1.2 Need for the Action

The Robb-Ledford and Blacktail WMAs provide year-round habitat, including critical winter habitat, for elk (*Cervus Canadensis)*, mule deer (*Odocoileus hemionus)*, moose (*Alces americanus)*, pronghorn (*Antilocapra Americana)*, greater sage-grouse (*Centrocercus urophasianus)*, and ruffed grouse (*Bonasa umbellus)*. Bighorn sheep (*Ovis Canadensis)* occupy habitats in close proximity to the proposed treatment areas on the Robb-Ledford WMA. The proposed treatment areas provide an ecologically important mix of aspen woodland, sagebrush grassland, Douglass fir, and limber pine forested habitats that meet the foraging, bedding, nesting, and cover needs of the aforementioned game species, as well as suites of small mammal, bird, and herp species. Sagebrush grassland was identified as a Tier 1 Community Type of Greatest Conservation Need in the 2015 FWP State Wildlife Action Plan, because of its relatively limited abundance and the high plant and animal diversity it supports. The greatest conservation threats are considered to be fragmentation, reduction due to human-related development, and conifer forest succession.

Primarily in response to wildfire suppression, sagebrush grassland habitats have and continue to be converted to conifer forest types across southwest Montana, at both broad and long (Figure 2) and fine and short (Figures 2 – 5) spacial and temporal scales. Without treatment or natural fire disturbance, plant succession within the proposed treatment areas (Figures 3 – 5) will progress to a climax of mature conifer forest as illustrated in Figure 2. Plant succession reaching the conifer climax state will diminish or replace the majority of existing sagebrush grassland habitats. Such succession will reduce plant diversity and abundance (Figure 6), thereby reducing the diversity and abundance of year-round forage and browse available to game and nongame wildlife species, and reduce the diversity of abundance of the wildlife species themselves.

Recent research indicates that sage grouse use of sagebrush grassland habitat for nesting is negatively impacted when conifer canopy density exceeds 3% (Severson et. al 2016). This threshold has or soon will be exceed on all 1,550 acres of sagebrush grassland habitat proposed to be treated. Severson et al. (2017) showed that female survival, nest success, and population increased following removal of conifer from treatment areas relative to control areas in Oregon. The proposed treatment would return these acres to functional sage-grouse nesting habitat. Without treatment, existing evergreen canopy and total acres impacted would be expected to increase, further reducing sage-grouse nesting habitat through time. Removal of competing conifer trees would also increase year-round forb, grass, and browse available to elk, mule deer, moose, pronghorn, sage grouse, and ruffed grouse

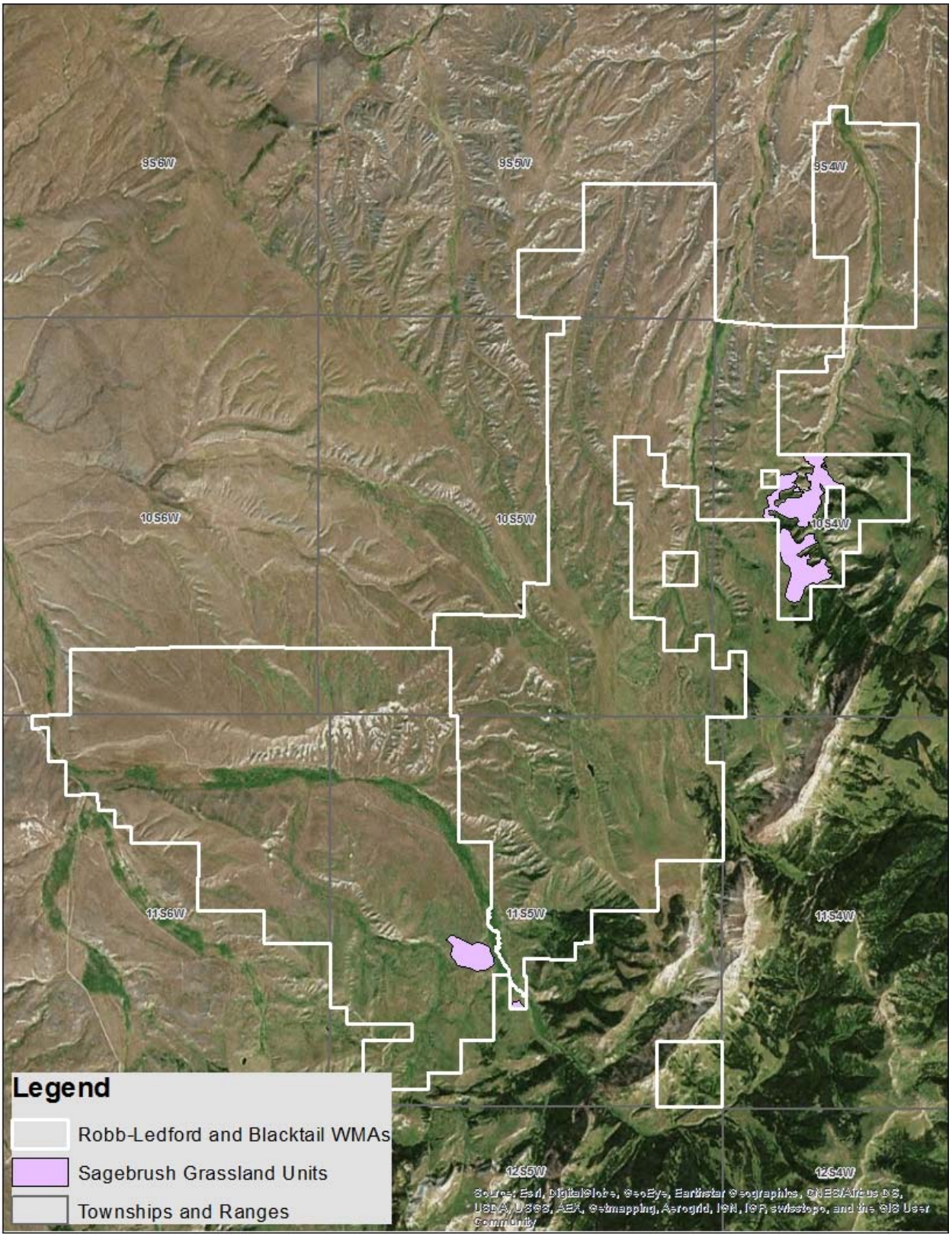

Figure 1. Proposed treatment boundaries within the Robb-Ledford and Blacktail WMAs.

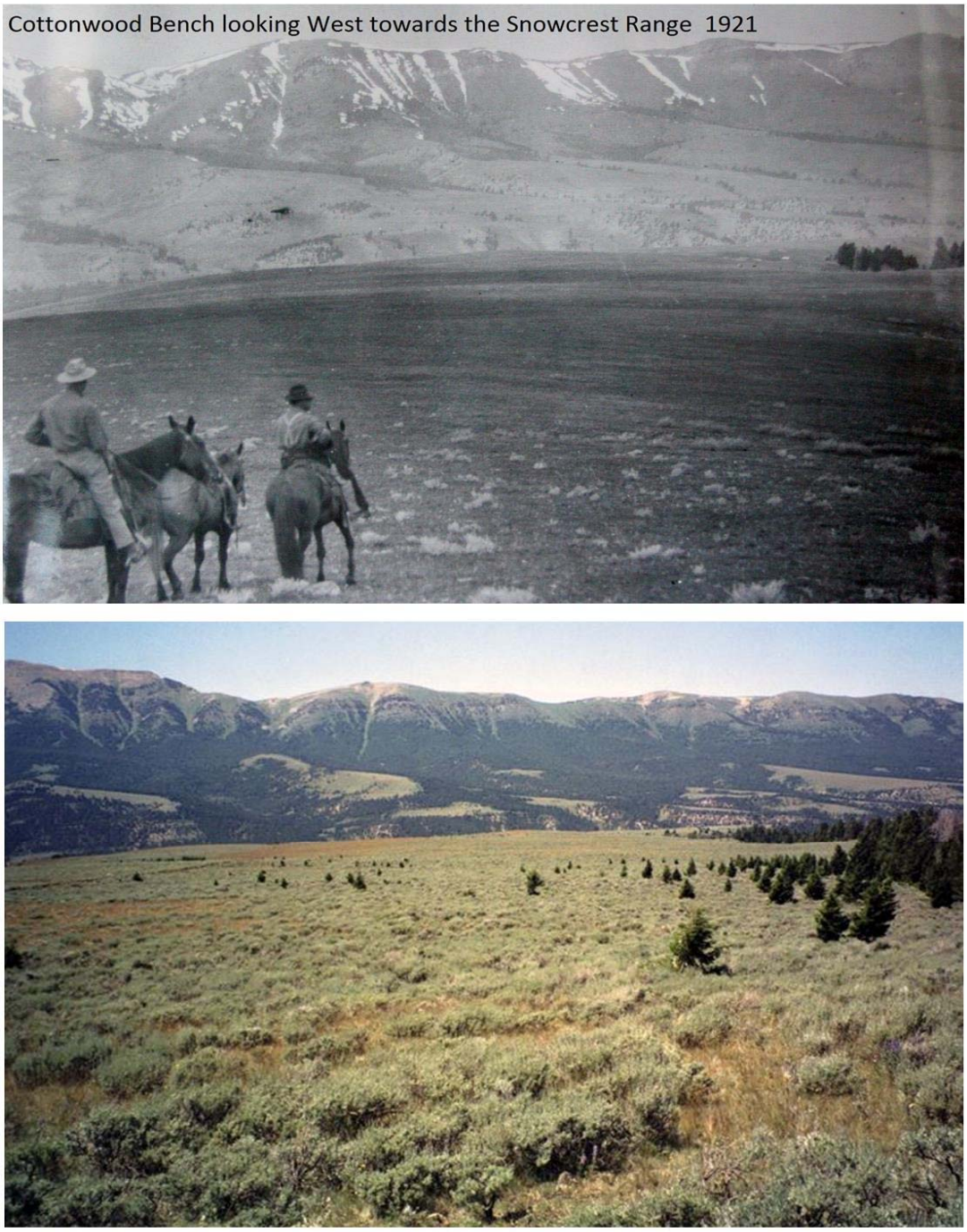

Figure 2. Temporal photo point, of the east side of the Snowcrest Mountains (Madison County Montana), illustrating broad-scale and long-term Douglass-fir forest expansion between 1921 and present.

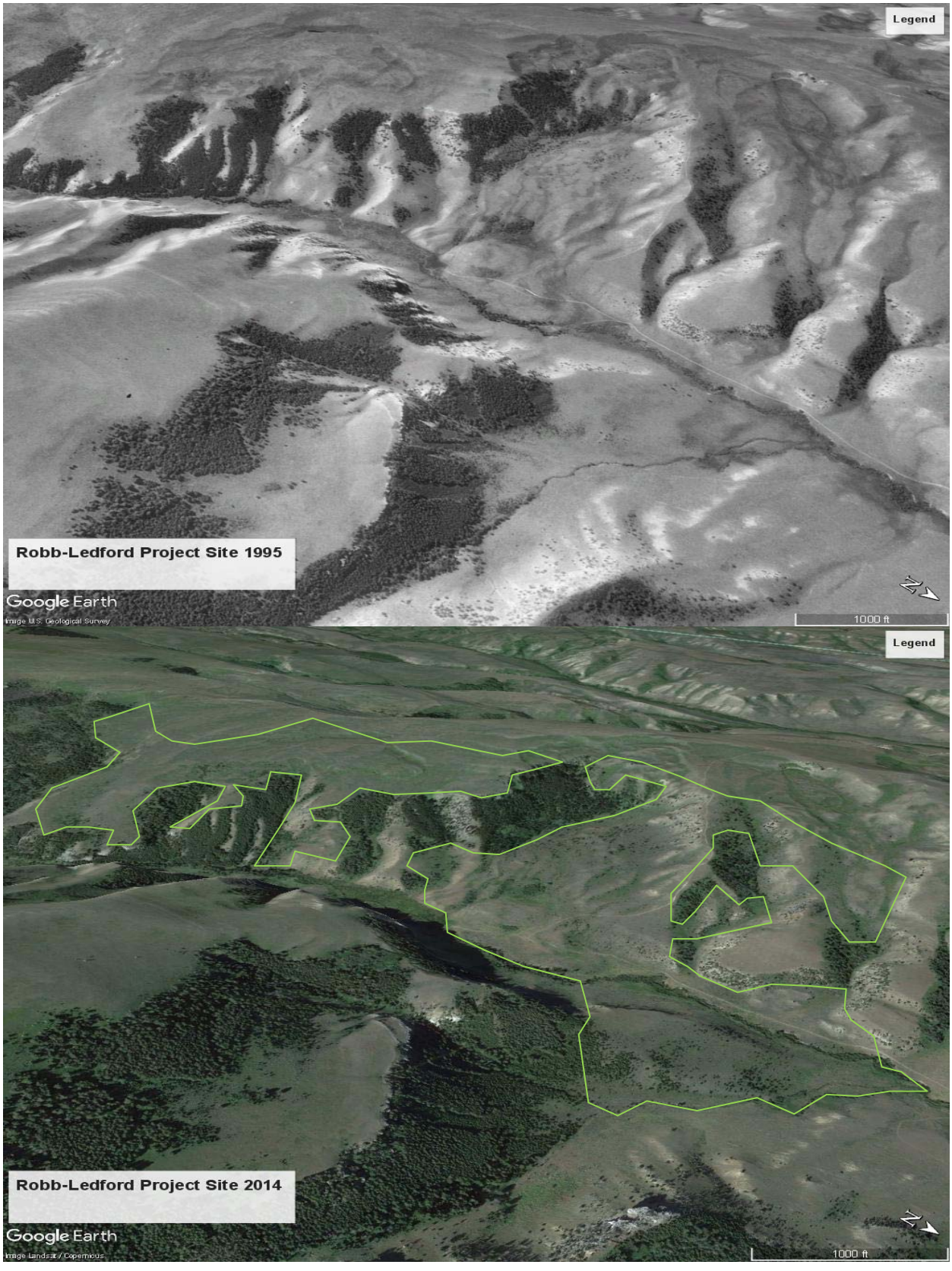

Figure 3. Comparison of the Robb-Ledford proposed project area, 1995-2014. Treatment area boundaries shown in green.

Figure 4. Comparison of the Blacktail Site 1 proposed project area, 1995-2014. Treatment boundary shown in green.

Figure 5. Comparison of the Blacktail Site 2 proposed project area, 1995-2014. Treatment boundary shown in green.

Figure 6. Typical fine-scale state of mountain sagebrush grassland prior to (top photo) and following (bottom photo) plant succession to conifer forest within southwest Montana.

Location of Project Area

The Robb-Ledford and Blacktail WMAs are located approximately 40 miles southeast of Dillon, Montana, along the west slope of the Snowcrest Mountains. They include portions of Beaverhead and Madison Counties (Figure 9). The Blacktail WMA portion of the proposed project would occur on portions of sections 20, 21, and 28 of T 11S, R 5W. The Robb-Ledford WMA portion of the project would occur on portions of sections 17, 18, 20, and 29 of T 10S, R 4W.

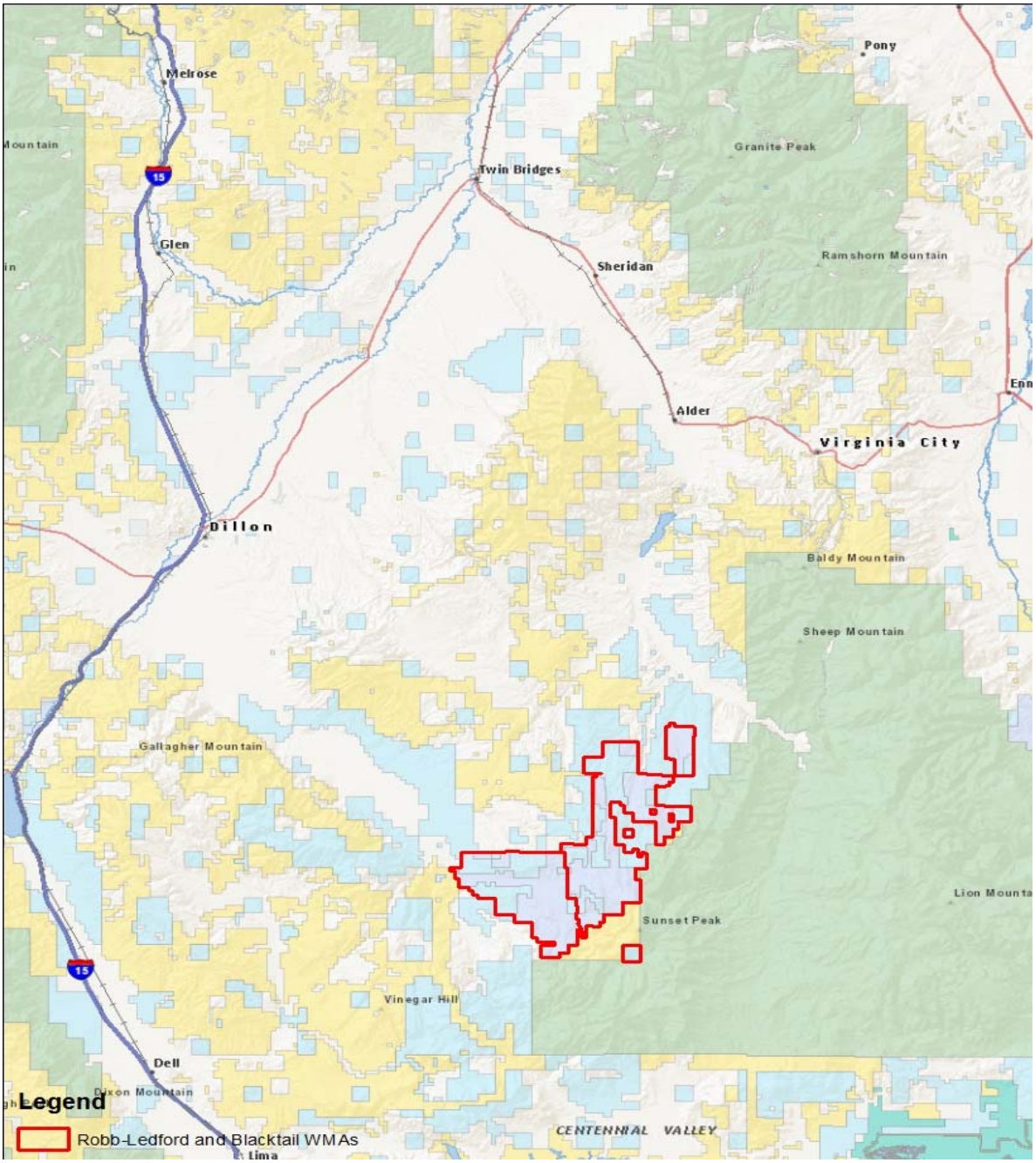

Figure 7: General location of the Robb-Ledford and Blacktail Wildlife Management Areas.

1.3 Objectives of the Proposed Action

1.3.1 Objective 1: Prevent loss of sagebrush grassland habitat by removing competing conifers.

1.3.2 Objective 2: Increase sage-grouse nesting habitat by removing conifers that have exceeded the 3% canopy threshold determined to reduce sage-grouse use.

1.3.3 Objective 3: Increase year- round forage and browse available to elk, mule deer, moose, pronghorn, sage-grouse, and ruff grouse by removing conifers that compete with forb, grass, and deciduous shrub species.

1.4 Relevant Plans and Authority

1.4.1 Section 87-1-201 (iv), Montana Code Annotated (MCA)

Section 87-1-201 (iv), MCA requires FWP to address fire mitigation and wildlife habitat enhancement, giving priority to forested lands in excess of 50 contiguous acres in any state park, fishing access site, or wildlife management area under the department's jurisdiction.

1.4.2 Section 87-1-201, MCA

Section 87-1-201, MCA gives FWP the authority to protect, enhance, and regulate the use of Montana's fish and wildlife resources for public benefit now and in the future. Habitat improvements as proposed in this assessment would enhance native plant communities so that they continue to support game and other wildlife species for the public to enjoy.

1.4.3 Montana Fish, Wildlife & Parks Commission Deer Management Policy (1998)

This policy, penned and adopted by the then FWP Commission in 1998, emphasizes protection and enhancement of mule deer habitats as one of three key components to managing for the long-term welfare of Montana's deer resource. This project as proposed would enhance approximately 145 acres of important mule deer winter range.

1.4.4 Montana Statewide Elk Management Plan (2005)

One goal specified in FWP's 2005 Elk Management Plan promotes improvement of elk habitat by maintaining vegetative diversity. The proposed project would work toward this by promoting retention of aspen and sagebrush-grassland stands through the removal of encroaching Douglas-fir on critical winter range.

1.4.5 Montana Department of Fish, Wildlife and Parks State Wildlife Action Plan (2015)

Under this conservation strategy, wildlife habitats and species have been assigned levels of conservation need. Tier 1 indicates species in greatest conservation need. FWP has identified these species as top priorities for conservation actions. Tier 2 indicates species of moderate

conservation priority. The habitats within the proposed treatment areas have been designated as being in greatest conservation need.

1.5 Overlapping Jurisdiction

1.5.1 Name of Agency and Responsibility

a. Montana State Historic Preservation Office – Cultural and Historic Resources
b. Madison County – Weed Management
c. Beaverhead County – Weed Management

1.6 Decision

Based on a review of the project as well as public comment, the FWP Region 3 Supervisor will decide whether or not to approve this habitat improvement project for the Robb-Ledford and Blacktail WMAs.

2.0: ALTERNATIVES

2.1 Alternative A (Proposed Action): Remove expanding Douglas fir, Rocky Mountain juniper, and limber pine from sagebrush grassland communities within the Robb-Ledford and Blacktail WMAs.

Site-specific project maps are shown in Figures 1, 3, 4, and 5. The following treatments are being proposed:

Sagebrush Treatment: Remove all Douglas-fir, Rocky Mountain juniper, and limber pine from within sagebrush stands. Most trees would be felled and left on site with larger trees being lopped and scattered. Occasional dense patches would be piled and burned when dried. Broadcast burning, in cooperation with Montana DNRC, would be considered in areas where piling is not practical and down fuel accumulations are high. Approximately 1,550 acres would be treated.

Project implementation would occur between May 15 and September 1 and would be scattered across multiple years (2017 – 2026) to minimize the impact at any one time and place. Pile or broadcast burning, if necessary, may occur under administrative access prior to May 15. Work would be completed by small hand crews. Portions of the project area would require limited use of off-road ATV travel to transport cutting supplies. Operations would be suspended during wet conditions when the ground is most susceptible to disturbance or if conditions are extremely dry and fire danger is high. The project is not expected to facilitate increased sediment erosion. However, adherence to Montana's Forestry Best Management Practices (BMPs) and Streamside Management Zone (SMZ) law would further reduce potential impacts to water quality.

All guidelines and recommendations for managing noxious weeds in FWP's Integrated Noxious Weed Management Plan (2008) would be adhered to. These include:

1. Surveying the proposed project area prior to tree removal to identify noxious weeds, mapping infestations, and controlling them by a combination of mechanical, biological, or chemical methods. The project area would be revisited indefinitely as part of annual WMA weed management.
2. Power washing any vehicles and equipment prior to its arrival on the WMA.
3. Seeding any disturbed areas with a native seed mixture appropriate for the area immediately upon completion.

FWP staff will continue to actively manage noxious weeds across the proposed project areas as part of regular WMA management. The proposed efforts would improve FWPs understanding of noxious weed distribution across the proposed project areas.

Estimated FWP cost of this project is $0. The project proposal is for local FWP staff and citizen volunteers to complete project implementation. A currently unknown amount of funds will be needed to purchase gas, oil, and chains for chainsaws. As these costs arise, the local FWP Wildlife Biologist would seek funds from volunteers, local Sportsmen's Clubs, and non-government organizations such as the Rocky Mountain Elk Foundation and the Mule Deer Foundation.

2.2 Alternative B (No Action): Implement No Conifer Removal and Status Quo is Maintained on the WMA.

FWP would not conduct any conifer removal projects on the Robb-Ledford and Blacktail WMAs under this alternative. FWP would continue noxious weed management activities within the WMA.

Douglas fir, Rocky Mountain juniper, and limber pine succession would continue unless natural fire disturbance occurred. Conifer succession will continue to fragment and replace sagebrush grassland habitat. This will reduce the amount of year-round forage and browse including critical winter forage and browse, available to elk, mule deer, pronghorn, and sage-grouse. Available sage-grouse nesting habitat would continue to be reduced through time.

3.0: AFFECTED ENVIRONMENT

3.1 Description of Relevant Pre-Existing Factors

The proposed project area has been identified as critical elk and mule deer winter range since at least the early 1950s. The Fish & Game Department (precursor to FWP) purchased the Blacktail WMA in 1972 because of its winter range values to elk, mule deer, and moose. Montana Fish, Wildlife and Parks and the Rocky Mountain Elk Foundation purchased the Robb-Ledford WMA in 1987 because of its winter range values to elk. Over the past century, fire suppression and climatic conditions have allowed Douglas fir, Rocky Mountain juniper, and limber pine to expand into sagebrush grassland.

3.2 Description of Relevant Affected Resources

3.2.1 Soil & Geologic

The project areas are located along the west slopes of the Snowcrest Mountains. They are located on Tertiary basin fill which are deep deposits of sediment comprised of gravel, sand, mud, volcanic ash, limestone and/or coal. Quaternary alluvium eroded from the surrounding mountains covers the basin fill in areas of recent deposition (e.g. streambeds).

Soils are primarily Mollisols, which generally form under a grassland cover in semi-arid to semi-humid areas with temperate climates. Mollisols have a nutrient-enriched surface soil, which results from the long-term addition of organic materials derived from plant roots.

3.2.2 Air & Noise

The Robb-Ledford and Blacktail WMAs are surrounded by Bureau of Land Management, United States Forest Service, DNRC, and undeveloped private lands. The area receives minimal human use during the summer and heavy human use during the autumn hunting seasons. The WMAs are closed to all human use from December 2 until May 15 to provide disturbance security to wintering wildlife. With the exception of the Blacktail WMA, all area lands are grazed by cattle during the summer and autumn seasons. Air quality is high and noise levels are limited to the occasional vehicle, gunshot, or livestock activity.

3.2.3 Water & Fisheries

The proposed project areas are near Ledford and the East Fork of Blacktail Deer creeks. Each are perennial streams that support a diversity of trout species which are managed by the FWP Fisheries Division. Several springs occur in the area.

3.2.4 Vegetation

The Robb-Ledford and Blacktail WMAs are a mosaic of grassland, sagebrush, aspen, and dry Douglas fir communities transected by riparian willow communities. Aspen woodlands are comprised mainly of pole-sized trees with a dense understory of small trees. Sagebrush stands are fairly continuous and healthy with multiple age classes represented. Some sagebrush grasslands are becoming fragmented by advancing Douglas fir. Douglas fir forests are dry with very little undergrowth. Tree size ranges from sapling to very large diameter. Some insect infestation is present and has induced limited mortality on Douglas fir and significant mortality on limber pine, particularly in higher elevation stands. Grasses in this area are primarily bluebunch wheatgrass, prairie junegrass, and Idaho fescue. The forb community is diverse.

3.2.5 Wildlife

The Robb-Ledford and Blacktail WMAs provide year around habitat including critical winter habitat for resident and migratory elk, mule deer, moose, pronghorn, sage grouse, and ruffed grouse. In addition, many other species are known to use the WMA year-round, seasonally, or occasionally including: bighorn sheep, white-tailed deer, black bear, grizzly bear, mountain lion, wolf, coyote, bobcat, beaver, and suits of bird, small mammal, and herp species.

3.2.6 Aesthetics

The Robb-Ledford and Blacktail WMAs offer a diverse natural landscape of native vegetation in a large tract of undeveloped land.

3.2.7 Cultural & Historic

The Robb-Ledford and Blacktail WMAs were privately owned until the department purchased them. Both properties were used for livestock production prior to FWP ownership. Log-built homesteads were present on each at the time of purchase and remain today.

3.2.8 Recreation

The Robb-Ledford and Blacktail WMAs are open for public recreation from noon on May 15 through December 1. The area provides public recreational opportunities such as hunting, hiking, fishing, camping, horseback riding, antler-hunting, and wildlife viewing. The WMAs are closed to all human recreation from December 2 to noon on May 15 to provide security for wintering wildlife.

3.2.9 Health Risks/Hazards

There are inherent risks associated with tree-felling activities. Pile and broadcast burning also pose inherent risks.

3.2.10 Community Resources

There is a county road in close proximity to the proposed Robb-Ledford treatment sites.

4.0: ENVIRONMENTAL CONSEQUENCES

4.1 Description of Relevant Affected Resources

4.1.1 Soil & Geologic

Predicted Consequences of Alternative A

Tree removal is expected to occur during the summer and fall when the ground is snow-free and dry. Off-road travel with ATVs would occur in remote portions of the project area in order to transport tools, equipment, and personnel. Work would not be conducted when conditions are wet. Because trees would be lopped and scattered, soil disturbance and compaction associated with skidding and decking operations would not be present. Because treatments would be temporally scattered and completed without using large equipment or methods that would disturbance measurable areas of topsoil, the project is not expected to facilitate any negative impacts to the soil resources.

Any substantially disturbed areas would be reseeded with native grasses and forbs to reduce new erosion patterns from becoming established. Any invading noxious weeds would be managed through implementation of FWP's Integrated Noxious Weed Management Plan.

FWP would meet the requirements of the Streamside Management Zone Law (MCA 77-5-301) which protects stream channels and banks and prohibits streamside activities that would diminish riparian habitat values.

There would be no short- or long-term effects to the overall geologic substrate.

Predicted Consequences of Alternative B
If the No Action alternative were chosen, no disturbance to the current soil conditions would occur from tree removal activity.

4.1.2 Air & Noise

Predicted Consequences of Alternative A
Equipment used during tree removal would create noise, dust, and emissions. Project implementation would occur during the summer when visitation to the WMAs is minimal. Workers would be exposed to intermittent noise levels that would require the use of hearing protection. No local residents are expected to be impacted by the noise. All generated noise and emissions are temporary and would cease at the completion of the tree removal activities.

Pile and broadcast burning, if necessary, may be conducted using administrative access prior to May 15. Burning will be conducted in cooperation with Montana DNRC and will follow all applicable laws for open burning and emissions.

Predicted Consequences of Alternative B
Ambient air quality and noise level would remain at the current levels if the No Action Alternative were chosen.

4.1.3 Water & Fisheries

Predicted Consequences of Alternative A
Because tree removal would be done by hand, there would be minimal erosion and sediment into resulting from this project. Off-road motorized travel would be necessary to access portions of the project area, but would not intersect any surface waters or expose any soils covered by vegetation. Since felled trees would be lopped and scattered instead of dragged to slash piles, there would be no need for skid trails that could cause erosion. Areas disturbed by this project would be reseeded with appropriate native grass/forb seed mixtures to reduce chances for erosion. Strict adherence to Montana's Forestry BMPs and SMZ law would additionally reduce potential impacts to water quality and help prevent increased sediment flows to creeks in the project area. Operations would be suspended when conditions are wet and the ground is more susceptible to disturbance. The project does not include any areas that are within a tree's length of a stream. Therefore, no direct physical impacts to streams would occur.

Predicted Consequences of Alternative B
Under the No Action Alternative, there would be no temporary OHV use in the area, including creek-crossings, to cause erosion or sedimentation in the creek.

4.1.4 Vegetation

Predicted Consequences of Alternative A
This project is expected to prevent loss of sagebrush grassland habitat by removing advancing conifers. Some vegetation would be temporarily damaged from off-road ATV travel and from pile or broadcast burning. All vehicles and equipment would be washed before coming on-site to minimize the spread of noxious weed seed. Disturbed soils would also be reseeded with appropriate native grasses and forbs upon completion of the project. Weed treatment would adhere to the guidance of FWP's Integrated Noxious Weed Management Plan.

Predicted Consequences of Alternative B
Douglas fir, Rocky Mountain juniper, and limber pine succession would continue unless natural fire disturbance occurred. Conifer advancement would continue to fragment and replace sagebrush grassland habitat.

4.1.5 Wildlife

Predicted Consequences of Alternative A
The proposed action would benefit elk, mule deer, moose, pronghorn, sage grouse, and ruffed grouse through increased year around forage and browse. The proposed action would further benefit sage grouse by increasing available nesting and brood rearing habitat. Suites of songbird and small mammal species would benefit through maintenance of plant and habitat diversity. These direct benefits to prey species would facilitate indirect benefits to all predator species occupying the area.

Project implementation would facilitate temporary disturbance to all area wildlife. Careful consideration of wildlife distribution would be made before using administrative access to facilitate pile or broadcast burning in the spring. This disturbance is not expected to facilitate measurable short- or long-term negative impacts to populations. They are expected to facilitate long-term benefits to all area wildlife.

Predicted Consequences of Alternative B
Under this alternative, none of the benefits listed in Alternative A would be realized. The amount of year around forage and browse available to ungulates would continue to decline. Advancing conifers will continue to reduce nesting and brood rearing habitat available to sage-grouse and other prairie-nesting birds.

4.1.6 Aesthetics

Predicted Consequences of Alternative A
There would be temporary effects to the visual quality of the project area post-treatment as lopped and scattered conifers break down. Pile or broadcast burns will create a visible mosaic of vegetation for several years. Stumps would be cut to a maximum of 6 inches in height to lessen visual impacts.

Predicted Consequences of Alternative B
Under the No Action Alternative, there would be no visual impacts from felled trees that have been lopped and scattered.

4.1.7 Recreation

Predicted Consequences of Alternative A
The project would be implemented during the summer when visitation to the Robb-Ledford and Blacktail WMAs is minimal. Work is expected to be completed by the start of archery season, when use of the area increases significantly. Recreationists may be impacted by project-associated traffic on the access road and tree-felling activity in the area. Negative impacts would be temporary due to the relatively short duration of activity.

Predicted Consequences of Alternative B
The public's access to the WMA for recreational activities would not be impacted.

4.1.8 Cultural & Historic

Predicted Consequences of Alternative A
No significant ground disturbing activities will take place to affect cultural or historical artifacts.

Predicted Consequences of Alternative B
No significant ground disturbing activities will take place to affect cultural or historical artifacts

4.1.9 Hazards / Risks

Predicted Consequences of Alternative A
This project would create temporary hazards associated with tree falling. The threat of fire ignition caused by equipment would be mitigated by suspending the operation during times of high fire danger. Recreationists in the project area during the time of tree removal would have to be mindful of tree-felling operations in order to avoid injury. Pile or broadcast burning has inherent risks associated with wildfire if they are not contained. These risks will be mitigated by employing professionals to assist in the planning and execution of any slash reduction by controlled burning.

Predicted Consequences of Alternative B
Under the No Action alternative, no hazards or risks would be assumed.

4.1.10 Community Resources

Predicted Consequences of Alternative A
No impacts to community resources would occur.

Predicted Consequences of Alternative B
No impacts to community resources would occur.

5.0 MONITORING & LONG-TERM MANAGEMENT

FWP's Sheridan Area Wildlife Biologist would oversee the implementation of this project. Regardless of implementation or no implementation, FWP would continue to implement ongoing noxious weed management across the proposed project areas. Photo points would be established to provide short and long-term visual site monitoring.

6.0 POTENTIAL LONG-TERM CONSEQUENCES

There is the potential for several positive long-term ecological consequences with the removal of conifers as proposed in this project. Sagebrush grassland habitat would remain intact and possibly expand in size with the removal of competing conifer trees. This is expected to increase year around forage and browse available to elk, mule deer, pronghorn, and sage grouse. It is also expected to increase the amount of nesting and brood rearing habitat available to sage grouse.

There are no anticipated long-term negative consequences of the proposed action.

7.0 PUBLIC PARTICIPATION AND COLLABORATORS

7.1 Public Participation

The value of conifer removal from sagebrush grassland has been discussed greatly with a diversity of southwest Montana publics over the past two years. FWP wildlife staff across southwest Montana is currently collaborating with the USFS, BLM, DNRC, NRCS, and private landowners on conifer removal projects.

The public would be notified in the following manner to comment on this draft EA:

- Project notices in each of these papers: *The Montana Standard* (Butte) and *The Madisonian* (Ennis), *The Dillon Tribune* (Dillon).
- One statewide press release
- Public notice on the Fish, Wildlife & Parks web page: *http://fwp.mt.gov*.

Copies of the draft EA will be available for public review at FWP Region 3 Headquarters and on the Fish Wildlife & Parks web page.

This level of public notice and participation is appropriate for a project of this scope.

The public comment period will extend for (30) thirty days. Written comments will be accepted until 5:00 p.m. on July 10, 2017, and can be mailed to the address below:

Robb-Ledford/Blacktail WMA Conifer Removal
Montana Fish, Wildlife & Parks
PO Box 758
Sheridan, MT 59749

Or email comments to: dwaltee@mt.gov .

Public volunteers will be solicited to participate with on-the-ground implementation of this project. The purpose of this would be to minimize the cost of implementation, and provide an opportunity for local wildlife biologists and members of the public to communicating about the value of habitat to wildlife, local habitat changes that have and continue to occur, and the value of habitat enhancement projects in managing those changes.

7.2 Collaborators - Other Agencies/Offices that Contributed to the EA

Montana Department of Fish, Wildlife & Parks: Legal, and Wildlife
Montana State Historic Preservation Office

8.0 ANTICIPATED TIMELINE

Public Comment Period of EA: June 9 – July 10, 2017
Decision Notice: July 17, 2017
Initiation of Project by: August 2017
Completion of Project: September 1, 2026

9.0 DETERMINATION IF AN ENVIRONMENTAL IMPACT STATEMENT IS REQUIRED

Based upon the above assessment, which has identified a limited number of minor impacts to the physical and human environment that will be either for a short duration or that the effects of the proposed project can be mitigated below the level of significance, an EIS in not required and an environmental assessment is the appropriate level of review.

10.0 EA PREPARER

Dean Waltee, FWP Wildlife Biologist Sheridan, MT

REFERENCES

Montana Fish, Wildlife & Parks Commission: Deer Management Policy, 1998.

Montana Fish, Wildlife & Parks: Statewide Elk Management Plan, 2005.

Montana Fish, Wildlife & Parks: Integrated Noxious Weed Management Plan, 2008.

Montana Fish, Wildlife, & Parks: State Wildlife Action Plan, 2015.

Severson J.P., Hagen C.A., Tack J.D., Maestas J.D., Naugle D.E., Forbes J.T., 2017. Better living through conifer removal: A demographic analysis of sage-grouse vital rates.PLoS ONE 12(3): e0174347. https://doi.org/10.1371/journal.pone.0174347

Severson, J. P., C. A. Hagen, J. D. Maestas, D. E. Naugle, J. T. Forbes, K. P. Reese. 2016. Effects of Conifer Expansion on Greater Sage-grouse Nesting Habitat Selection. Journal of Wildlife Management. 81(1): pp 86-95

Sam B. Sheppard June 9, 2017